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ABSTRACT

The 22-campus California State University (CSU) system recently sponsored an online faculty development institute to help college instructors learn how to create pedagogically sound online instruction. The Tools, Templates, and Training (T3) workshop, which is now available to interested faculty and institutions throughout the world, was designed to foster immediate success and encourage incremental development of online course materials; faculty could begin with just a page or two, work up to a course module, and eventually understand the scope of effort necessary to scale their online modules to a full online course. This paper describes the genesis of the online workshop, outlines the underlying design principles, presents an overview of the workshop modules (introduction, connect, apply, reflect, and extend), and reviews the lessons learned from the project. (AEF)

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

Teaching and Learning Online: Tools, Templates, and Training

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The 22-campus California State University (CSU) system recently sponsored an on-line faculty development institute to help college instructors learn how to create pedagogically sound on-line instruction. The workshop is now available to interested faculty and institutions throughout the world. This paper describes the genesis of the online workshop, describes the underlying instructional principles, presents an overview of the workshop modules, and reviews the lessons learned from the project.

How the Online Workshop Came About

Higher education faculty are content experts. Most were not hired for their teaching ability or teaching experience. Few were screened for their computer skills, and, it's probably safe to say, almost no search committees include web development skills in their criteria. Once on campus, faculty are busy teaching, researching, and performing community service. Those with the inclination to develop web-based courses almost certainly don't have the time to do so, particularly if they are young, enthusiastic, and untenured. That a few faculty do develop web-based material is remarkable, but their exceptional successes prove the rule.

As educational technologists, we were interested in providing an environment in which faculty can continue to be what they are—content experts, with perhaps a feel for and, ideally, some experience in teaching. That meant providing significant support both for developing sound pedagogy and for the technical aspects of web development. To try to meet these requirements we decided to put together a suite of templates that reflected both "best practices" from an instructional design perspective and simplicity and robustness from a technical standpoint.

We designed the Tools, Templates, and Training (T3) workshop to provide instructors with the conceptual understanding they need to develop and manage online course materials and activities, along with some automated tools and templates to relieve them of complex technical tasks. The workshop went online in May, 1997.

The first participants to participate in the workshop were so-called "lead faculty" and "staff" on most of the CSU campuses. Ideally, one or both of these individuals had some prior experience developing an online course, or parts thereof. These individuals would take the course, receiving intensive support from graduate students at SDSU, and would then be responsible for providing the same type of coaching and mentoring for two additional faculty on their own campus as they participated in the online workshop.

Finally, the two additional faculty were each to recruit and coach three other faculty interested in developing online course material. The idea was to create a critical mass of capable faculty on each campus to coach and mentor others as the need arose. We at SDSU provided software tools and support for the first tier, software tools only for the second tier, and nothing for the third tier.

Implicit in the design of the T3 workshop was the need to model effective online course delivery for faculty. This modeling would help each participant to feel what it's like from their students' point of view, thereby providing them with insight into how to design their own courses. It would also give them a fully-worked example of how an online course can "look and feel," to aid them in making decisions about their own courses.

Underlying Design Principles

Toward this end, the workshop was designed to foster immediate success and encourage incremental development of online course materials. Faculty could begin with just a page or two, work up to a course module, and eventually understand the scope of effort necessary to scale their online modules to a full online course. The workshop facilitated faculty as they developed online course modules by providing templates to help create a course "marketing" page and instructor home page, then moving on to course pages such as a schedule and information page, and finally creating an instructional module using both innovative and traditional instructional strategies.

Perhaps the most important design principle was the idea that both instructors and students benefit from having a "mental model" of the course. Stop reading, close your

eyes for a moment, and notice what you "see" when you think of a course you teach regularly. Did you "see" a kind of abstract diagram with a bubble or "chunk" for each week or each class session? Did you "see" your syllabus? Did you "see" the room in which you last taught the course, along with the students and the entire classroom environment? Did you "see" yourself talking with a series of students who have taken the course in the past?

Whatever you "saw" when you thought of your course is probably closely related to what we mean by your "mental model" for that course. It's what helps you organize the course in your head. Students, too, have mental models of their courses. They may be related to the materials, such as texts used in a course; to the physical space, such as a classroom, they associate with the course; to the other people involved in the course; or perhaps to timelines of assignments or coming due or the course meeting schedule.

These mental models are what help both instructors and students organize their experience of the course. A clear mental model will presumably help instructors create clearer courses and help students organize their course work more effectively. In any case, we realized that students taking online courses have mental models as well. We hypothesized that by creating a clear course structure, we could facilitate students generating a clear mental model of the course, in turn helping them succeed. We further reasoned that if the course structure reflected the course pedagogy, or instructional design, it would further help both instructors and students think clearly and usefully about the course.

An Overview of the Workshop

To this end we devised a course design based on a simple pedagogical model. We designed each module in our online workshop around this five-step model, which we call the "I CARE" system. I CARE stands for "Introduction, Connect, Apply, Reflect, and Extend." I CARE is distilled from basic instructional design practice, adapting various systems or "steps of instruction" to what seemed to us to be particularly useful components for an online course.

Synchronous, face-to-face courses usually entail regularly scheduled meetings, and course syllabi are typically organized around that schedule. Since many online courses tend to have a strong asynchronous component, or even be entirely asynchronous, we divided our course into "modules" or "sessions" rather than "weeks" or "dates." This recognized learners' prerogative to organize their course time around work, family, and other commitments, while maintaining a modular structure of "do-able chunks" arranged in a progressive series.

Each module, in turn, represented a pedagogically complete "lesson" that can be completed in roughly the equivalent of the time a student would devote to a face-to-face class session and corresponding out-of-class work. Thus, in our online workshop, each module or session was implemented using the I CARE system. Each of these sections are designed to enhance students' learning opportunities.

Introduction

The introductory section serves to "place the present module in the context of the course as a whole, and enliven learner's prior knowledge with regard to the content that is about to be presented. This section should include clearly stated objectives for the module so that learners know exactly what they are supposed to be "getting" from the module. The introduction may also provide motivational elements, such as a scenario that poses a familiar or relevant problem for learners that may be used in subsequent sections as well.

Connect

The connect section is primarily for presenting new information in context. It may consist of online text with appropriate visualizations, such as charts, diagrams, illustrations, visual analogies, and other media elements such as sound or appropriate virtual environments. Alternatively, it may consist primarily of instructions to read offline text material, view a videotape, or listen to a sound recording. The connect section should be designed to help learners organize the new material in the context of what they already know, and prepare them to apply this information in the next section.

Apply

This is the practice section of the module. It might involve writing a short paper or a section of a longer work. It could involve a hands-on project such as classifying rock samples (virtual or actual), analyzing earthquake patterns, or developing a web page. It might be an individual or small group project, or involve students interviewing local subjects or subject matter experts. You might implement the apply section using a WebQuest (Dodge, 1997), a prompted writing tool, an interactive online experiment, or simply provide instructions for an offline activity you wish students to complete. Students might create a concept map or draft a plan. In short, any activity that gives learners a chance to try out their new information in an appropriate context is fair game.

Reflect

Often the least valued—and frequently one of the most needed—stages in a pedagogically sound lesson is to give students an opportunity to reflect on their newly acquired skills and knowledge. This might take the form of a thoughtful response to a carefully crafted question from the instructor, or a peer exchange about lessons learned, insights gained, and so forth. It might be implemented through an online chat or a more deliberative online forum. You might ask learners to keep an electronic journal to submit or use in a later assignment.

Extend

Like the introduction, the extend section has many possible functions. It can provide closure, prompt further exploration and learning, assess students' skills and knowledge, give students an opportunity to evaluate the course itself, or all of the above. This is a good place to provide references or resources "for further information" or for advanced work on the topic.

The T3 online workshop describes the I CARE system, models it for workshop participants, and provides other examples of I CARE and other pedagogically sound systems for organizing online learning. The workshop consists of a five-module on-line course featuring:

1. Strategies and tactics for on-line teaching and learning: Benefits and limitations of on-line learning. Identifying course content appropriate for on-line delivery. Implementing traditional pedagogies on-line. New possibilities and opportunities for teaching and learning on-line. Best practices in on-line instruction and education.
2. Document preparation for on-line courses: Using specially designed templates for helping professors quickly and easily mount course-related web sites. The I CARE (Introduction, Connect, Apply, Reflect, Extend) system. Using HTML editors; preparing graphics and media files. Converting existing text (word processing) files for delivery via the world wide web.
3. On-line student learning activities: Organizing selected course content around on-line learning activities. Best practices in on-line learning. Creating activities that are easy to implement and maintain. Questing the web in search of content, activities and other resources.
4. Growing an on-line learning community: Facilitating on-line student communication by designing and managing on-line forums and chats. Creating and maintaining student document exchanges.
5. Management of on-line course resources: Developing and maintaining course-related on-line publications and activities. Strategies for increasing personal productivity as an author and manager of on-line course resources. Developing a plan for gradual improvement of on-line course-related content and activities. Identifying local campus support for web-based publishing.

This approach is applicable to the development of on-line courses in all disciplines, but is particularly suited to teacher training and school leadership development courses because it models sound teaching and learning practices. In addition to the original 40 or so CSU faculty who developed course modules as part of their participation in the Faculty Development Institute, we have received requests from a number of individual faculty and faculty development coordinators at a variety of universities throughout the country who are interested in using the online workshop on a personal or institutional basis. The course is free, entirely asynchronous, and will be maintained indefinitely on SDSU's web servers.

The T3 online workshop is located at http://clgr.sdsu.edu and click on "T3."

In addition to the many examples by workshop participants (click on "People" in the T3 menu bar), several examples of online courses developed using the T3 approach are also available for scrutiny.

One such example is the course "Technology for School Leaders" that provides K-12 principals, technology coordinators, and lead teachers with the "big picture" of school technology integration (pro and con). It helps them "speak the language," assess their schools' specific technology needs, and plan for effective classroom implementation. The course may be viewed at edweb.sdsu.edu/courses/edtec670/index.html.

Lessons Learned

We understood from the beginning that a team approach to online course development would be useful. Our experience developing and implementing the online workshop underlined that idea again and again.

During the development phase, for instance, we benefited greatly from the collaboration of a team of three faculty and four graduate students. The faculty were able to help generate, review, and revise one another's work. The graduate students helped draft modules, implement web page layouts and visuals, and provide technical support for tasks like web page-database interactions.

On the workshop participant side, our intention was to foster strong campus development teams by training and supporting strong lead faculty and staff on each campus, who in turn would coach and support additional faculty. To this end we attempted to screen prospective lead faculty and staff for their past experience with online course development or related tasks. On some campuses, however, adequately experienced volunteers were not forthcoming, and we "settled" for less skilled, albeit highly enthusiastic, substitutes. This resulted in mixed success for the initial workshop. On the majority of campuses, where lead faculty were both proactive with respect to their leadership role and already had at least a modicum of experience in web development, the workshop flourished and faculty participants raved. On a few campuses, where lead faculty themselves were floundering in technical problems or failed to provide leadership for the other faculty, the workshop fizzled. We concluded that, while the idea of screening onsite leadership is sound, the implementation, including followup support, is crucial and should not be compromised.

This and other evidence also led us to conclude that we had been over-confident about faculty ability to author online courses. As noted above, we aimed the course at faculty with little or no web development experience (with the exception of lead faculty), which describes most of the

faculty in our institutions of higher education. We hypothesized that by providing easy-to-use tools (such as Claris HomePage for web page authoring), instructional design templates for courses and course modules, and training consisting of the online workshop itself with coaching from lead faculty and staff on each campus, that faculty could successfully author good quality online courses.

This proved only partially true. While many participants raved about the I CARE system and the workshop as a whole, others reported occasional to chronic frustration. The experience of one participant is instructive. A history professor who joined our workshop was an outstanding teacher who had participated in experimental two-way interactive video courses in past semesters. He was enthusiastic about putting parts of his course online and plunged into the T3 workshop with characteristic energy.

Despite his background as an instructor with a proven track record teaching with technology, his computer got the best of him. In the context of his interactive video course, the technology was handled by a team of video production experts. He had only to adapt his teaching style to the constraints and affordances of the technology. In our workshop, he was asked to actually handle the technology himself. He did not give up easily. He solicited and received the support of his campus T3 staff person, who visited him in his office and tried to help him work out the technical problems he was experiencing. Nevertheless, the technical problems did not go away. Eventually he threw in the towel and reluctantly resigned from the workshop, explaining that he had come to the realization that he would need to spend an inordinate amount of time simply getting his computer system up and running in a useful way, and that he was, rightfully, unwilling to commit that time in addition to the time it would take to participate in the course as well. While this was an extreme case, it is probably familiar at least in kind to anyone who has attempted this type of development.

This and other participants' experiences led us to reformulate our thinking about how best to foster online course development in higher education. We realized that most faculty not only don't have the requisite instructional, media development, and technical skills to single-handedly author online courses, but that they are unlikely to develop those skills to any significant degree through a workshop such as ours. The overall success of the T3 workshop was probably more a result of self-selection by faculty who were already sufficiently "technology-ready" and able to either provide or seek out adequate technical support. They probably represent a minority of current faculty, and that demographic seems unlikely to change significantly in the near future. However, it is probably not useful to expect most faculty who are not at a level of technological sophistication to author online courses by themselves. Like our history professor, it is probably too time-consuming, and perhaps in some cases altogether impossible, to acquire those skills lacking the requisite aptitude. The solution to this problem seems to be the return to the team approach as described in the beginning of this report, but with an even greater emphasis and support.

In addition to the team approach, there appear to be four additional skill sets required for successful online course development. The first is expert content knowledge as provided by a faculty member. Content expertise is what they were trained to do by their degrees, hired to do by their peers, and regularly assessed for with respect to promotion and tenure. That said, we would suggest that even here there is much to recommend a team approach. With several faculty on a development team, there is more opportunity for quality assurance through collaborative generation and peer review of both content and pedagogical strategies. Since online and other distributed learning courses will potentially be seen by many more students than a similar face-to-face course, with the corollate that the institution as a whole will be judged to a greater degree on the overall merits of these course "products," it seems worth the extra effort and expense to ensure only high quality offerings in the online arena, particularly with respect to content.

The second skill set, instructional design, is a little more ambiguous. While usually untrained in teaching, many faculty have nonetheless become good or even great teachers, and others are willing and able to learn to become good pedagogists, particularly in the context of systematic development of online courses which does not rely heavily on personal characteristics such as charisma or "presence." But in cases where faculty may not have sufficient experience or interest in pedagogy (or time to devote to it), the course development team should include a professional instructional designer. Instructional designers are trained to work with content experts, media developers, and technicians to develop instructional programs or products, and are often skilled in project management as well.

The generation of media products is the third skill set. Online courses depend almost exclusively on media products, be they books, web pages, videotapes, or CD-ROMs. Neither faculty nor, for the most part, instructional designers, are trained in media production methods such as graphics, video, and multimedia development. These require competent artists, video production personnel and multimedia developers. This may be a team of 30 to 40 people at one extreme (as is the case in British Open University development teams, for example), or merely a skilled graduate student or two. In either case, these individuals are typically not trained in *instructional* graphic, video, and multimedia development, and need to work together with faculty and instructional designers to create effective online courses.

The fourth skill set emerges out of the present state of online course development, which is characterized by an

expanding tool set of primarily computer-based technologies. What was once limited to inserting a few strategic html tags has become a rather staggering array of far more complex technologies, such as Java and JavaScript, Shockwave movies and their requisite "plug-ins," CGIs, forms, web page-database interactions, frames, layers, image maps, archived and real time streaming audio and video, and much more. While these technologies offer useful strategies for online teaching and learning, the sheer number and complexity of these new tools leave most of us gasping for air. Serious online course development efforts must include dedicated technical support staff to set up and maintain servers, load and maintain software, and to consult on bandwidth and compatibility issues.

These four "skill sets" (content expertise, instructional design, media production, and technical support) seem to be the basic components of effective online course development teams.

Another lesson learned from developing and implementing the T3 online workshop was the value of various methods of support. As described above, most participants in the original workshop were either screened by T3 staff or self-selected, probably to a large extent for technical aptitude. Even so, several faculty participants needed direct support from the T3 staff. One tool we found particularly useful for direct coaching in technical areas was screen sharing software, in our case, Timbuktu (Netopia, 1997). On several occasions T3 graduate assistants or faculty in San Diego assisted workshop participants in distant parts of the state by accessing their computer screens on our own screens, and even controlling their mouse and keyboard to demonstrate techniques while talking with them on the telephone. This software was easy to install and use, and worked flawlessly, even across platforms, with reasonably fast Internet connections being the only requisite.

Finally, throughout the time we have been developing and implementing the T3 online workshop and other online courses, we have become aware of a kind of "natural" taxonomy of development activities. We could describe them as development on the "learning activity" level, the "course" level, and the "program" level.

Most faculty and even institutional effort, including the T3 workshop, is focused primarily on the course level, dealing with the practical concerns of getting courses online in much the same way we put a course into the classroom. But one of the lessons learned from veteran distance learning providers is that we would do well to think also in terms of whole programs, when viewed from a "marketing" perspective. If one of our goals is to attract new students (in order to enhance quality, diversity, revenue, or all of the above), they are more likely to come to an integrated certificate or degree program than they are to seek out a single interesting course.

At the same time, perhaps the most manageable realm in which to develop is the "learning activity" level. Almost any individual or small group of faculty can manage development of small, well-designed online learning activities. Wonderful examples of these are the Virtual Flylab and the Virtual Earthquake (http://vflylab.calstatela.edu/Welcome.html). This level is particularly appealing because online course developers could potentially pick and choose these activities for their online courses in the same way we pick and choose journal articles for reading packets. Drawbacks to this level of development activity include figuring out how to pay for it (grants? subscription fees?) and server and software maintenance issues.

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